

Appl. No. 10/071,702
Amdt. & Resp. Dated April 5, 2004
Reply to Office Action of January 29, 2004

Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (withdrawn): A system for oxygenating blood and delivering the oxygenated blood to a patient, the system comprising:

- a blood pump assembly coupled to a supply of blood;
- a blood oxygenation assembly coupled to the blood pump assembly, the blood oxygenation assembly receiving the blood from the blood pump assembly and oxygenating the blood, the blood oxygenation assembly comprising a membrane oxygenator comprising:
 - a housing having a first end portion and a second end portion;
 - a plurality of tubular membranes disposed in the housing, each of the plurality of tubular membranes having an internal surface and an external surface;
 - a first inlet in the housing arranged to deliver oxygen gas into contact with only the external surface of each of the plurality of tubular membranes;
 - a second inlet in the housing arranged to deliver the blood into contact with only the internal surface of each of the plurality of tubular membranes, wherein the oxygen gas diffuses through the tubular membranes and into the blood to form the oxygenated blood; and
 - an outlet in the housing for expelling the oxygenated blood; and
- a delivery assembly coupled to the outlet, the delivery assembly being adapted to deliver the oxygenated blood to a patient.

Claim 2 (withdrawn): A system for oxygenating blood and delivering the oxygenated blood to a patient, the system comprising:

- a blood pump assembly coupled to a supply of blood;
- a blood oxygenation assembly coupled to the blood pump assembly, the blood oxygenation assembly receiving the blood from the blood pump assembly and oxygenating the blood, the blood oxygenation assembly comprising a membrane oxygenator comprising:
 - a housing having a first end portion, a second end portion, and an oxygen gas inlet port;

Appl. No. 10/071,702
Amdt. & Resp. Dated April 5, 2004
Reply to Office Action of January 29, 2004

a plurality of hollow fibers disposed within the housing, the plurality of hollow fibers generally extending between the first end portion and the second end portion of the housing, the plurality of hollow fibers being adapted to pass fluid from the first end portion of the housing to the second end portion of the housing while permitting oxygen gas diffusion therethrough;

a first seal disposed about the plurality of hollow fibers in the first end portion of the housing and a second seal disposed about the plurality of hollow fibers in the second end portion of the housing, the first and the second seal defining therebetween a gas chamber within the housing, the gas chamber being coupled to the oxygen gas inlet port;

a first end cap disposed on the first end portion of the housing, the first end cap having a blood inlet port and defining a blood inlet manifold between the first end cap and the first seal; and

a second end cap disposed on the second end portion of the housing, the second end cap having a blood outlet port and defining a blood outlet manifold between the second end cap and the second seal; and

a delivery assembly coupled to the blood outlet port, the delivery assembly being adapted to deliver the oxygenated blood to a patient.

Claim 3 (original): A device for oxygenating blood and delivering the oxygenated blood to a patient, the system comprising:

a blood pump assembly coupled to a supply of blood;

a blood oxygenation assembly coupled to the blood pump assembly, the blood oxygenation assembly receiving the blood from the blood pump assembly and oxygenating the blood, the blood oxygenation assembly comprising:

a mixer having an internal mixing chamber having a first inlet, a second inlet, and an outlet, the blood pump adapted to deliver the blood to the mixing chamber of the mixer via the first inlet; and

a fluid supply assembly adapted to deliver a gas-supersaturated physiologic fluid to the mixing chamber of the mixer via the second inlet, the

Appl. No. 10/071,702
Amdr. & Resp. Dated April 5, 2004
Reply to Office Action of January 29, 2004

blood and the physiologic fluid mixing with one another to form the oxygenated blood; and

a delivery assembly coupled to the outlet, the delivery assembly being adapted to deliver the oxygenated blood to a patient.

Claim 4 (original): The device, as set forth in claim 3, wherein the physiologic fluid comprises saline.

Claim 5 (original): The device, as set forth in claim 3, wherein the oxygenated blood is hyperoxic.

Claim 6 (original): The device, as set forth in claim 3, wherein the oxygenated blood is hyperbaric.

Claim 7 (original): The device, as set forth in claim 3, wherein the first inlet is arranged to create a vortical flow in the mixing chamber.

Claim 8 (original): The device, as set forth in claim 3, wherein the mixing chamber is pressurizable.

Claim 9 (original): The device, as set forth in claim 3, comprising a control assembly coupled to the blood pump.

Claim 10 (original): The device, as set forth in claim 9, comprising a display coupled to the control assembly.

Claim 11 (original): The device, as set forth in claim 3, wherein the blood pump receives the blood from the patient.

Appl. No. 10/071,702
Amdt. & Resp. Dated April 5, 2004
Reply to Office Action of January 29, 2004

Claim 12 (original): The device, as set forth in claim 3, wherein the mixing chamber comprises a substantially cylindrical wall and wherein the first inlet is arranged to direct fluid along a path substantially tangential to the cylindrical wall.